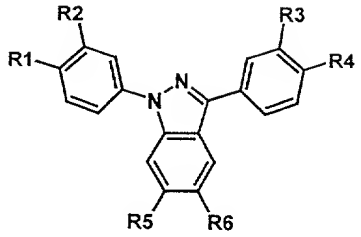
Claims:

1. Compounds represented by formula (I)



(Formula (I))

wherein

one of the radicals R^1 or R^2 and one of the radicals R^3 or R^4 is hydrogen and the other is independently –COOH, -$COOR^7$, -$CONH_2$, -$CONH(CH_2)_nOH$, wherein n = 2 – 8, -$CONR^8R^9$, -CH_2OH, - CH_2NH_2, -NO_2, $NR^{10}R^{11}$, $NHCOR^{12}$, Cl, Br, F, -CF_3, $O(C_1$-$C_4)$-alkyl,which could be substituted by methyl or phenyl at any of the carbons C_1-C_4, -N=C=O, N=C=S, -SO_3H, -$SO_2NH(CH_2)_nNH_2$, (C_1-C_4) alkyl, (C_1-C_{16})-alkyl substituted at the terminal carbon with –COOH, -$COOR^7$, -$CONH_2$, -$CONR^8R^9$, -$CONH(CH_2)_nOH$, wherein n = 2 – 8, -CH_2OH, -CH_2NH_2 , -N=C=O, N=C=S, -SO_3H, -$SO_2NH(CH_2)_nNH_2$, -$CONH(CH_2)_nNH_2$, wherein n = 2 – 8, and the NH_2-group could also be substituted by (C_1-C_4) alkyl or a commonly used amino protecting group such as *tert*-butyloxycarbonyl, 9-fluorenylmethoxycarbonyl, phthalimido, trifluoroacetamido, methoxycarbonyl, ethoxycarbonyl, benzyloxycarbonyl, allyloxycarbonyl, 2,2,2-trichloroethoxycarbonyl, 2-(trimethylsilyl)ethoxycarbonyl,

and one of the radicals R^5 or R^6 is hydrogen and the other is hydrogen, halogen, $O(C_1$-$C_4)$-alkyl which could be substituted by methyl or phenyl at any of the carbons C_1-C_4), -NO_2, $NR^{10}R^{11}$, $NHCOR^{12}$, (C_1-C_4) alkyl,

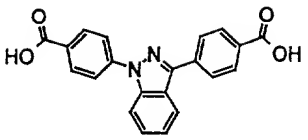
$(C_1$-$C_{16})$-alkyl substituted at the terminal carbon with –COOH, -$COOR^7$, -$CONH_2$, -$CONR^8R^9$, -$CONH(CH_2)_nOH$, wherein n = 2 – 8, -CH_2OH, -CH_2NH_2 , -N=C=O, N=C=S, -SO_3H, -$SO_2NH(CH_2)_nNH_2$, -$CONH(CH_2)_nNH_2$, wherein n = 2 – 8, and the NH_2-group could also be substituted by $(C_1$- $C_4)$ alkyl or a commonly used amino protecting group,

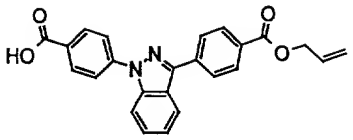
R^7 is a commonly used carboxyl protecting or carboxyl activating group

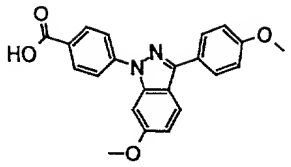
R^8 or R^9 is hydrogen and the other is lower alkyl $(C_1$-$C_4)$, phenyl, benzyl, or R^8 and R^9 are part of a 5 or 6 membered ring.

R^{10} and R^{11} are independently hydrogen or $(C_1$-$C_4)$alkyl
R^{12} is $(C_1$-$C_{10})$alkyl, phenyl, which both can be substituted by $(C_1$-$C_4)$ alkyl, protected amino group or halogen.

2. Compounds according to claim 1 represented by the following structures:







3. Compounds represented by formula (II – III)

A-B-D-C-D′-E (Formula (II))
A-B-D-E-D′-C (Formula (III))

wherein

A is a solid support selected from standard materials applied in solid phase and solution phase organic chemistry.

B is a linker allowing cleavage of fluorescent conjugates of formula (II-III) for liberation of the D-C-D′-E or D-E-D′-C fragment, respectively.
C is a compound selected from formula (I)

D and D′ are independently a bond or a spacer selected from α,ω-diamino-alkanes, diaminocyclohexyl, bis-(aminomethyl)-substituted phenyl, α-amino-ω-hydroxy-alkanes, alkylamines, cyclic alkylamines or cyclic alkyldiamines or amino acids without or with additional functionality in the side chain.

E is the molecule to be investigated.

4. Compounds according to claim 3 wherein

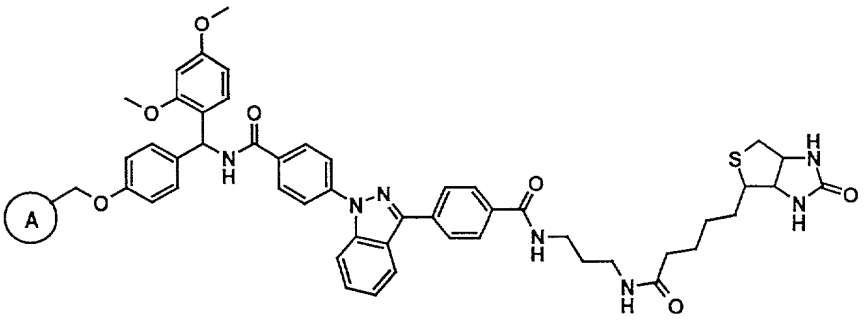
A is selected from functionalized polystyrene based resins, polyacrylamide based polymers, polystyrene / polydimethylacrylamide composites, PEGA resins, polystyrene-polyoxyethylene based supports, Tentagel, PEG-polystyrene graft polymeric supports, glass surfaces, functionalized surfaces, materials grafted with functionalized surfaces, or polyethylenglycol.

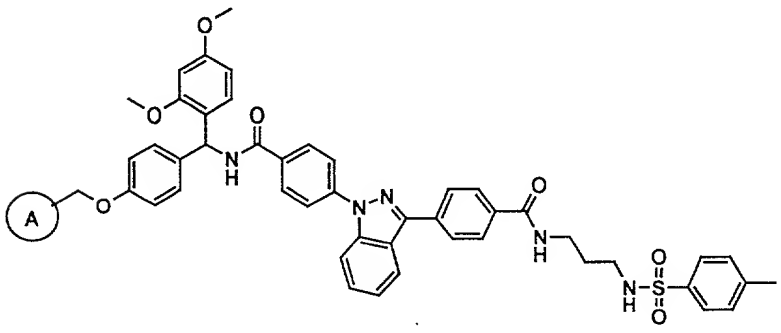
B is selected from benzyl, benzhydryl, benzhydryliden, trityl, xanthenyl, benzoin, silicon, or allyl based linkers.

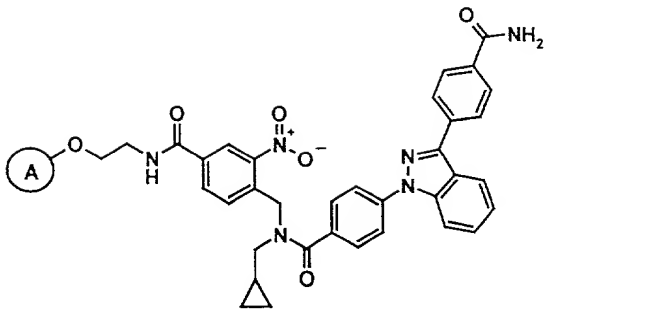
C is a compound selected from formula (I)

E is a low molecular weight compound, a peptide, a protein, a carbohydrate, a nucleic acid, or a lipid containing a functional group for conjugate formation

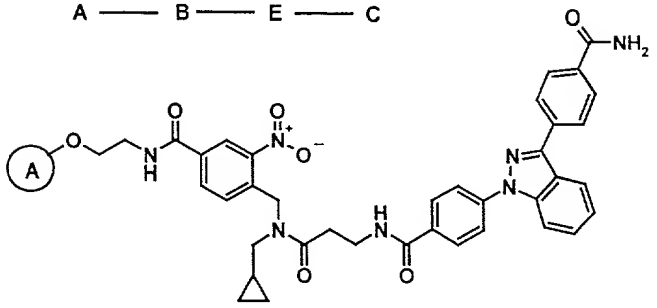
5. Compounds according to claim 3 represented by the following structures:







A — B — E — C



A — B — E — D´ — C

A — B — D — E — C

6. Compounds represented by formula (IV):

E-D´-C (Formula (IV))

wherein

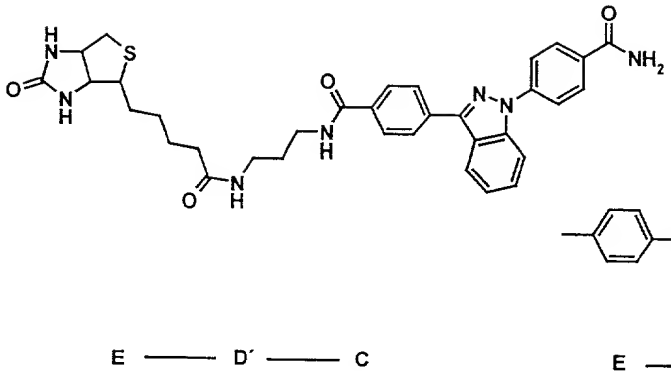
E is the molecule to be investigated

D´ is a bond or a spacer selected from α,ω-diamino-alkanes, diaminocyclohexyl, bis-(aminomethyl)-substituted phenyl, α-amino-ω-hydroxy-alkanes, alkylamines, cyclic

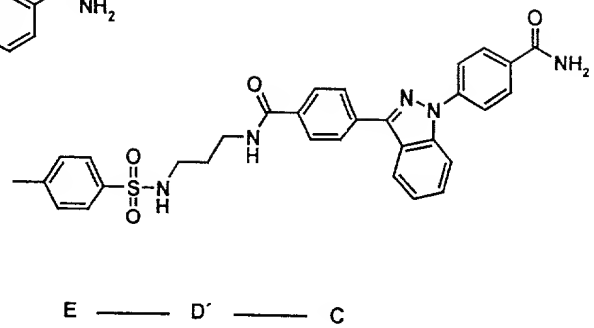
alkylamines, cyclic alkyldiamines or amino acids without or with additional functionality in the side chain

C is a compound selected from formula (I)

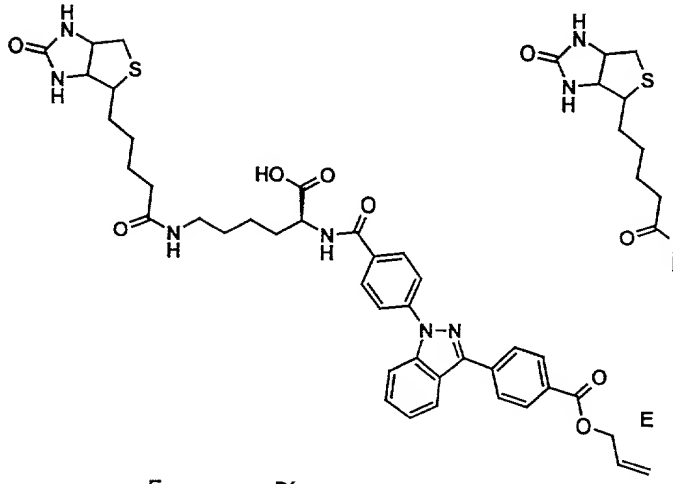
7. Compounds according to claim 6 represented by the following structures:



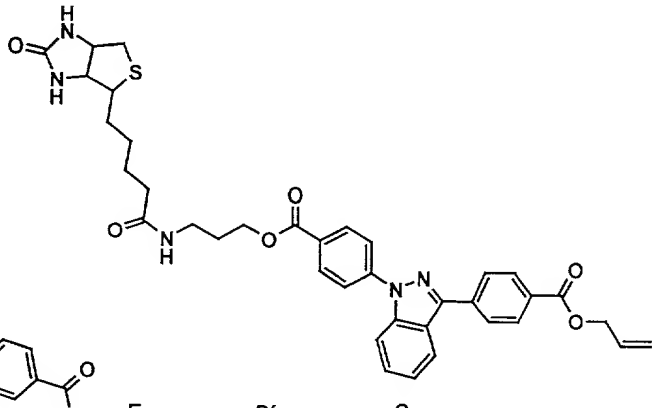
E —— D´ —— C



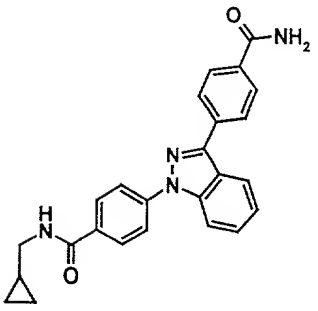
E —— D´ —— C



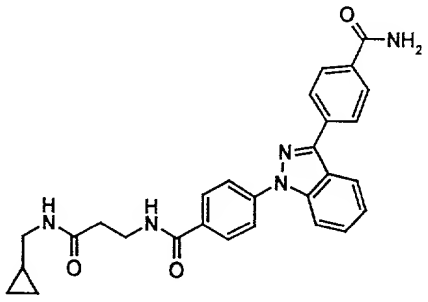
E —— D´ —— C



E —— D´ —— C



E —— C



E —— D´ —— C

8. A method for identification of an interaction between an AIDA labelled molecule and a binding molecule in homogeneous solution wherein the method comprises the following steps:

Step 1A: Providing an AIDA labelled molecule selected from formula (IV)

Step 1B: Admixing the AIDA-labelled molecule of formula (IV) with a binding molecule; and then

Step 1C: selectively detecting a binding event with the AIDA-labelled molecule described in Step 1B and the binding molecule by methods of fluorescence spectroscopy.

9. Method according to claim 8 wherein the methods of fluorescence spectroscopy are measurements of

- Increase of fluorescence anisotropy/polarisation of AIDA emission in continuos wave = prompt = steady state fluorometers,
- Increase of rotational correlation time in time-resolved fluorescence equipments
- Increase in translation diffusion time in single molecule fluorescence experiments determined from autocorrelation calculations on the time trace of fluorescence fluctuations,
- Increase or decrease of AIDA fluorescence emission in the wavelength range between 350 and 700 nm with excitation wavelengths in the range between 300 and 400 nm,
- Fluorescence resonance energy transfer (donor quenching or acceptor sensitisation) from excited tryptophan (donor) in the binding molecule which in this case is a peptide or protein to the AIDA dye (acceptor) in the molecule of the conjugate,
- Fluorescence resonance energy transfer (donor quenching or acceptor sensitisation) from the excited AIDA dye in the conjugate molecule (donor) to a fluorescent label (acceptor) of the binding molecule which in this case can comprise any compound class.

10. A method for identification of an interaction between an AIDA labelled molecule on the solid support which is conventionally used in solid phase organic chemistry and a binding molecule in homogeneous solution containing the solid support wherein the method comprises the following steps:

Step 2A: Providing an AIDA labelled molecule as conjugate of formula (II or III)

Step 2B: Admixing the AIDA-labelled molecule as conjugate of formula (II or III) with a binding molecule; and then

Step 2C: selectively detecting a binding event with the AIDA-labelled molecule described in Step 2B and the binding molecule by methods used in fluorescence spectroscopy resulting in a quantitative signal providing a means to identify the AIDA-linked molecule with the highest binding affinity to the binding molecule,

Step 2D: Isolation of the solid support containing the identified AIDA-molecule represented by formula (II or III)

Step 2E: : Selectively detecting a binding event with the AIDA-labelled molecule described in Step 2D and the binding molecule by various methods used in fluorescence spectroscopy described in the procedure 1A-C.

11. Method according to claim 10 wherein the fluorescence spectroscopic methods in step 2C are

- Direct detection of binding of fluorescently labelled macromolecules to AIDA containing solid supports applying confocal microscopic and spectroscopic techniques
- measurement of enhancement of the change in molecular brightness by chemically linking AIDA to a second environmentally sensitive molecule as

commonly used in conventional fluorescence spectroscopy performed during the synthesis of the compound on the solid support,

- measurement of fluorescence resonance energy transfer: From AIDA to a suitable long wavelength dye which will thereby be sensitised using AIDA UV-excitation detected by change in molecular brightness at the emission wavelength of the long wavelength dye,
- measurement of fluorescence resonance energy transfer: Reduction of specific brightness of AIDA on the molecule linked to the solid support at 351nm excitation and 400 nm emission wavelengths,
- Detection of the change in quantum yield by measuring reduction or increase in molecular brightness by time-resolved single molecule spectroscopy.